Patent Claims

1. A hard metal substrate body comprised of a WC hard material phase and a binder phase of 3 to 25 mass % which apart from at least one of the binder metals Fe, Co and/or Ni contains up to 15 mass % of the binder phase dissolved dopant selected from the group comprised of Al, Cr, V, Nb, Ta, Ti, Zr, Hf, characterized in that the percentage proportion of all doping agents in the hard metal is limited to a maximum of 4 mass % in that the proportion of a cubic phase in the hard metal is less than 4 volume % and in that the binder metal content in a hard metal-substrate body boundary zone falls from up to 1 μm, preferably up to 0.5 μm to less than 0.5 times the binder content in the substrate body interior.

2. The hard metal substrate body according to claim 1 characterized in that the concentration of the binder phase falls gradually toward the substrate body surface and the concentration of the dopant gradually increases in a corresponding manner.

3. The hard metal substrate body according to claim 1 or 2 characterized in that the grain size of the WC is $\leq$ 1.5 μm whereby the WC fine hard metal (grain size $\leq$ 0.8 μm) and/or with WC ultrafine grain hard metal (grain size $\leq$ 0.5 μm), preferably contain Cr, V and/or Ta as dopant.

4. The hard metal substrate body characterized in that at lest one layer is applied to the substrate body surface, the layer being comprised of a carbide, nitride and/or carbonitride of Ti, Zr and/or Hf and/or of Al_2O_3, HfO_2, ZrO_2, oxides, amorphous carbon, diamond, cubic boron nitride, carbon nitride (CN_x) or another compound of at least one of the elements B, C, N and/or O.

5. The hard metal substrate body according to claims 1 to 4 characterized in that in the boundary zone close to the surface there is an enrichment with nitride or carbonitride of the metal dopant.

6. A method of producing a hard metal substrate body according to one of claims 1 to 5 in which the starting mixture is preheated powder metallurgically is prepressed to a green body and then in an atmosphere of a furnace is heated and sintered, characterized in that in the heating phase, after reaching the eutectic, but no later than reaching the sintering temperature the vacuum or inert gas atmosphere is replaced with a N_2 atmosphere with a N_2 pressure of $\leq 10^5$ Pa and is maintained at least until the sintering temperature is reached.

7. The method of making a hard metal substrate body according to one of claims 1 to 5 in which the starting mixture is powder metallurgically treated and is pressed to a green body and

finally heated in an atmosphere of a furnace and sintered, characterized in that after finish sintering or optionally in a final treatment above the eutectic temperature, the sintered body is maintained in a N_2 atmosphere under a pressure (p) of 10^5 Pa < p < 10^7 Pa for at least 10 minutes.

8. The method according to claim 6 or 7 characterized in that the nitrogen atmosphere is established by introducing precursors that is N-containing gases whereby the nitrogen is formed *in situ* in the gas atmosphere.

9. The method according to one of claims 6 to 8 characterized in that the body is heated up to 1250°C during the heating phase and this temperature is held for at least 20 minutes, preferably more than 1 hour, before the heating up is continued to the sintering temperature.

10. The method according to one of claims 6, 8 or 9 characterized in that initially in the heating up phase at about 1200°C the previously existing vacuum is replaced by an inert gas atmosphere, preferably with a pressure of 10^3 Pa to 10^4 Pa and only upon reaching the sintering temperature is a nitrogen containing atmosphere established with a higher pressure, preferably $\geq 10^4$ Pa.

11. The method according to one of claims 6 to 10 characterized in that the heating up rate and the cooling down rate amounts to up to 10°C/min, preferably between 2°C/min and 5°C/min.

12. The method according to one of claims 6 to 11 characterized in that the starting mixture contains up to 15 mass % of the binder phase additional carbides, nitrides, carbonitrides of the elements of Group IVa or VIa of the periodic system or Al or complex carbides, complex nitrides and/or complex carbonitrides of the form Ti_2AlC, Ti_2AlN, Cr_2AlN, Cr_2AlC.